News from the Savannah River Site

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SRS Makes Key Progress on Nuclear Legacy Groundwater Cleanup

AIKEN, S.C. (Sept. 9, 2021) – The Savannah River Site (SRS) has made significant progress in cleaning up contaminated groundwater left from legacy nuclear operations near the Site's now shuttered F Area Canyon and the still active H Area Canyon chemical separations facilities, affirming the Site's continued commitment to environmental remediation.

Low-level radioactive waste solutions were generated from operations in F and H Canyons and were disposed of for decades in pond-like pools of water known as seepage basins, which was the accepted method at the time. However, with advances in waste processing, this disposal method became outdated. The last of the basins were backfilled, capped and closed in 1991; however, 33 years of use had resulted in hazardous and radioactive contamination of the groundwater beneath each basin.

After the basins were closed, post-closure care and groundwater corrective actions were initiated in accordance with a permit issued by the South Carolina Department of Health and Environmental Control. Initially, SRS constructed and used two Water Treatment Units to clean the contaminated groundwater by extracting, treating and reinjecting the water once clean. However, this method was costly to operate, produced large volumes of radioactive waste sludge that was expensive to dispose of and became less effective as the groundwater cleanup progressed. In 2004, SRS transitioned to a new, phased groundwater clean-up approach employing new innovative remedial technologies. These technologies include installing underground barrier walls, in a funnel-and-gate configuration, that redirect and channel groundwater flow toward base injection zones that make the groundwater less acidic and reduce the migration of contaminants. The new system is a shift towards a more passive system that provides for improved remedial effectiveness, is more cost effective and doesn't create radioactive waste that has to be managed and disposed of.

F Area Operator Thomas Harman (left) and SRNS Scientist Kevin Boerstler check the pumps, sensors, and piping that blend a base concentrate to inject into acidic groundwater at SRS, part of the Site's environmental remediation strategy.

"The groundwater under the basins is acidic from nitric acid present in the waste solutions," said Jeffrey Thibault, Engineering and Remediation Support for SRS management and operations contractor Savannah River Nuclear Solutions (SRNS). "The acidic property of the water allows some contaminants to remain dissolved and slowly migrate with the groundwater towards a nearby stream. Our system uses a wall to direct the water into open spaces, called gates, where a base solution is injected into the water to increase the pH and slow down the movement of the contaminants."

The environmentally harmless base solution is made by mixing clean water, from the Site's drinking water system, with a base concentrate and baking soda. A system of pumps, sensors, and piping, mounted on a small metal skid platform, blends the concentrate with water in precise proportions prior to delivering the solution through underground pipes to a network of 24 injection wells at F Area. The wells are turned on when treatment is needed to neutralize the acidic water. Once enough base has been injected, the wells are turned off and remain off for a period of 12 to 18 months, until sampling data shows treatment is required again. A similar system is located in H Area.

Since SRNS became the SRS managing and operating contractor in 2008, 126.4 million gallons of base solution have been injected into the groundwater at F Area and 46.3 million gallons at H Area.

"We've seen great results from this method," said Thibault. "It's effectively a passive system, meaning we only run it every few months, when testing shows that the acidity is increasing in the soil again; it's economically friendly; and, most importantly, it's environmentally friendly, restores the pH of the groundwater to more natural conditions and lets nature essentially take care of itself. Restoring the neutral pH of groundwater at F and H Areas reduces the migration of hazardous and radioactive metal contaminants in the groundwater and acts to protect a nearby stream."

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